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TECHNICAL MEMORANDUM

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**To:** Kristine Koch and Sean Sheldrake, EPA  
**From:** Bruce Jacobs and Peter Shanahan, HAI  
**Subject:** **Review of draft of Portland Harbor Feasibility Study Appendix A – Derivation of Risk-Based PRGs, June 16, 2014**  
**Date:** July 10, 2014

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This memorandum reviews EPA's draft Appendix A of the Feasibility Study, which describes the derivation of the risk-based Preliminary Remediation Goals (PRGs). The Appendix A materials, emailed by Kristine Koch on June 16, 2014, include the following four files:

- Appendix A1.docx
- RBT Derivation\_TG\_ji\_rev3.docx
- 2014-04-11 Portland Harbor Eco PRGs\_REV 1.xlsx
- Portland Harbor Eco RBT Tables.xlsx

This memo provides our general comments on these materials. We are also forwarding the two above Word documents with our detailed comments embedded. This review has been prepared on behalf of the Five Tribes<sup>1</sup>.

### **General Comments**

The human health risk threshold PRG calculations in Appendix A1 are represented as adaptations of risk calculations presented in the Baseline Human Health Risk Assessment (BHHRA). The equations presented in Appendix A1 use different notation than the BHHRA, and many of the variables are not defined. While an experienced risk assessor would likely be sufficiently familiar with the equations to follow the appendix, this is not the case for non-specialists and especially most members of the public. The presentation makes it difficult to understand how the equations were derived and how they were evaluated in determining the PRG values. We recommend that step-by-step derivations of the "adapted" equations be presented, that the equation notation be made fully consistent with the BHHRA, and that all variables appearing in the appendix be defined.

In some parts of the appendix, critical details are omitted. For example, the threshold concentrations are specified as functions of risk (in the case of cancer) and hazard quotient (in the case of non-cancer

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<sup>1</sup> The five tribes are the Confederated Tribes of The Grand Ronde Community of Oregon, the Nez Perce Tribe, the Confederated Tribes of Siletz Indians, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of the Warm Springs Reservation of Oregon.

impacts), but the actual values of risk and hazard quotient used to calculate PRGs are not given. Key details were also omitted with respect to the selection of values used in calculating exposure to infants, including the fraction of chemical stored in fat, fraction of mother's weight that is fat, and fraction of fat in breast milk. While these parameters are defined in the BHHRA report, recommended values are not specified for these parameters, and there is no indication of what values were used in calculating human health risk. Additional description of the food-web model and how its results were used in calculating threshold risk values would also be helpful, as would a more detailed description of how the whole-body to fillet concentrations were used in determining the tissue-based PRGs.

In general, the presentation in Appendix A1 would greatly benefit from the inclusion of a spreadsheet in which the equations presented in Appendix A1 are embedded as formulas within the spreadsheet and with all exposure and other model parameters defined. This would support the description of PRG derivations by clarifying any possible misinterpretations of the report text.

The discussion of ecological PRGs, while appropriate in detail and description for an internal document that might be used to guide discussions of approach and interpretation of results, does not provide sufficient information to allow non-specialists or the public to make an assessment about the appropriateness of the derived PRGs. We recommend that the document be revised to provide the level of detail and context needed for the appendix to be understood by a wider audience.